Marketing Guide

VariTrac™ Changeover-Bypass VAV Systems

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The VariTrac History

Trane brought their expertise in variable air volume (VAV) controls into the changeover-bypass zoning market with the introduction of VariTrac in 1989. The concept of changeover-bypass zoning brings the flexibility and comfort of VAV systems into the light commercial unitary market, at an affordable price.

The first generation of VariTrac was a 16-zone pressure dependent system. The zone dampers featured the same electronic zone controller Trane developed for its VAV boxes, operating in the pressure dependent mode. The heart of the system was the Comfort Manager™; a panel which was designed to manage the HVAC unit, bypass damper functions, and changeover decisions. The functional concept of this original system continues to be the backbone of today's zoning system.

In the early 90s, two important enhancements were added to the system:

- Trane's new Comm 4 communications link for the damper controllers
- The ability to directly communicate with Trane's new Voyager UCP electronic rooftop unit controls

In 1995, Trane introduced the second generation of VariTrac. This generation featured the central control panel (CCP) as the functional replacement for Comfort Manager. The new panel featured a resin enclosure, optional relay board for 24 VAC unit control, and the move to static pressure for bypass control. Improved changeover control was added to the operating system, and the zone damper controls were upgraded to UCM Version 3.

Now, in 2002, Trane introduces the next generation of VariTrac controls which includes all the great features of the original VariTrac system, plus new features and enhancements. The enhancements are designed to make this generation of VariTrac the simplest changeover-bypass zoning system to install, commission, and service of any light commercial controls system available today.

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Introduction

Why Changeover-Bypass VAV

Packaged unitary systems offer one of today's most popular and cost-effective methods for supplying conditioned air to small commercial buildings. The unitary machine most commonly used has a constant volume fan with a fixed outside air damper and a single thermostat. While this may meet the thermal requirements of the space, it may not meet all the comfort requirements of the space using a single thermostat for control.

Changeover-bypass VAV is a design solution for this problem. As the name implies, these systems deliver a varying volume of air to multiple zones, each with its own thermostat, while still utilizing a unitary machine with a constant volume fan. Changeover-bypass-VAV combines the comfort benefits of VAV with the cost effectiveness of packaged unitary equipment.

The light commercial HVAC marketplace is known for its high level of competition. Knowing how to position Trane's zoning products against the competition is critical. Over the past couple of years, Trane has added "value" items to its standard product package. In many instances, competitors must resort to add-ons or upgraded systems to achieve similar operating results or benefits obtained by Trane products. Learning how to leverage both Trane's value over the competition and defend against perceived competitor advantage is vital to the company's light commercial business and obtaining increased market share.

This marketing guide is designed to help sales personnel prepare for effective selling of the redesigned VariTrac changeover-bypass zoning system.

By utilizing an existing product to new product comparison, Trane's advantage in areas such as value, flexibility, and integrated controls will be explained. This enables the sales force to arm themselves with superior product knowledge of Trane's zoning systems and their operation.

The Delivered Systems Concept

Delivered products represent approximately eighty percent of the light commercial building market. The term ***delivered product*** refers to the relationship between the manufacturer and the contractor. The relationship is often limited to the sale and delivery of the product. The contractor takes full responsibility for installation and service. Delivered products contrast with ***applied products***, for which the relationship between manufacturer and contractor extends to product selection, installation, commissioning, programming, and on-going service support.

Opportunities for Trane to participate in the light commercial market for delivered products have never been as plentiful as they are today. The relationships that you foster and maintain with your contractors are essential to your success in increasing your VariTrac market share. Training your contractors to become self-sufficient in selling, applying, installing, and servicing VariTrac systems requires that you invest time to train them. The potential return on your investment is well worth the time. This relationship, in which you represent Trane as both supplier and educator, is your business opportunity.

Features and Benefits

The primary advantage of Trane's zoning systems is that they are completely integrated systems with Trane's unitary equipment. Another benefit is that these systems are so simple to install, operate and service, that contractors and installers can take advantage of the delivered concept versus the applied world of design, engineering, and programming. For more information, refer to the table below which describes and compares the features and benefits of Trane's newest changeover-bypass VAV offering to the existing product.

Product Changes at a Glance

VariTrac II	***New* VariTrac III**
CCP	CCP with 3 piece enclosure design and optional Operator Display
Optional relay board with installation kit	Quick snap-in optional relay board with easy to wire terminal strip
Duct mounted pressure and temperature sensors hard wired back to the CCP	Communicating sensor assembly including a UCM 4 with integral temperature and pressure sensor, and output to the bypass damper(s)
Bypass damper hardwired back to the CCP	Bypass damper with factory installed wiring harness for plug-in connection to communicating sensor assembly
16 zones	24 zones
Zone dampers with UCM 3 boards	Zone dampers with UCM 4 boards with: • Zone occupancy sensor input • Zone CO2 sensor input
Round zone damper sizes: • 6", 8", 10", 12", 14", and 16"	Added new rectangular zone dampers in sizes: • 8x12, 8x14, 8x16, 10x16, 10x20, 14x18
Comm 4 communications to the zone dampers	Same Comm 4 communications to the zone dampers for reliable operation and backward compatibility
Comm 3 communications to Tracker	Supports Comm 5 communications to the new Tracker Version 10 panel
PC edit terminal required for interfacing with the system (HyperTerminal)	Optional touch-screen operator display with built in 7-day time clock . Windows based PC software.
Round bypass damper sizes: • 6", 8", 10", and 12" Rectangular bypass damper sizes: • 14x12, 16x16, 20x20, 30x20	Bypass dampers now come with factory installed wiring harness for plug-in connection to communicating sensor assembly
Manual analog zone sensors only	Digital display zone temperature sensor
Not applicable	Zone occupancy sensor
Not applicable	Zone CO2 sensor Duct mount CO2 sensor
Pressure independent boxes	Ability to use pressure independent boxes
Add local heat	Ability to add local heat

Hardware Overview

Central Control Panel Enclosure
The new VariTrac Central Control Panel (CCP) has a three-piece enclosure for simplified installation. All wiring is done on large, easily accessible terminal strips located in the wall mount base plate. The electronics are located in the middle section, which is snapped onto the base plate after mounting. The top section is either a blank face plate, or the optional operator display.

Central Control Panel Operator Display
The optional operator display (OD) is a back-lit liquid crystal display with touch-screen programming capability. Through the display you can access system status and zone status, and do basic set-up of the zone UCMs and the CCP system operating parameters. It is designed to give an installer the ability to commission a VariTrac system without requiring a PC. Additionally, the OD has a seven-day time clock built in to provide stand alone scheduling capability of the VariTrac system. Zones may be divided into four groups, each with its own schedule if desired. If there is no Tracker system on the job, the CCP must be ordered with a display. If Tracker is available, the CCP may have a blank cover plate installed instead of an OD. All set-up information for the CCP may then be accessed from the Tracker.

Central Control Panel Optional Relay Board
The new relay board does not require any mounting hardware or time consuming installation. It simply snaps into place. The terminal strip is now internally jumpered, so it may be wired directly to an HVAC unit low voltage terminal strip using the same terminal designations as an industry standard thermostat subbase.

Communicating Sensor/Bypass Control Assembly
The VariTrac duct sensors have been combined with a UCM into one factory-wired assembly, so it now resides on the Comm 4 link along with the zone dampers and Voyager/Precedent™ rooftop unit. The bypass damper is also wired to this assembly. This eliminates the multiple conductors and terminations between the CCP, the duct sensors and the bypass damper, where most installation errors occurred.

Bypass Damper Installation Harness
All bypass dampers will now be shipped with a 12-foot plenum-rated wiring harness attached to the damper at the factory. The harness has a polarized plug on the end which is plugged into the communicating sensor assembly control board. This eliminates bypass damper wiring errors during installation.

Digital Display Zone Sensor
The new digital display zone sensor has the look and functionality of the standard Trane zone sensor, but includes an LCD digital display of the space temperature and setpoint adjustment in degrees F or C. The sensor has ON and CANCEL buttons, and a communications jack which can be accessed without removing the cover. The sensor requires 24 volts, and may share a power supply with UCM.

Zone Occupancy Sensor
The new zone occupancy sensor is a ceiling-mount infrared motion detector to be used with VariTrac zone damper UCM for controlling the occupied zone standby function. It can detect motion over a 360 degree range (adjustable) for up to a 1200 square foot area. It has SPDT isolated contacts for connection to the UCM occupancy input. The sensor requires 24 volts, and may share a power supply with UCM.

Zone CO2 Sensor
The zone CO2 sensor is a compact transmitter for use with the VariTrac UCM CO2 input for doing demand control ventilation. The sensor is a available in either wall- or duct-mount enclosures. The sensor requires 24 volts, and may share a power supply with UCM.

VariTrac PC Software
Advanced set-up functions in VariTrac are now done with a new Windows®-based, graphical PC software program. Connection between the PC and the CCP is done with a standard serial port cable connection.

VariTrac Function Overview

Increased Zone Count
The new VariTrac system now support 24 zones instead of 16. The zones may be VariTrac dampers, or any type of VariTrane VAV box including fan-powered boxes or boxes with factory-installed local heat.

Automatic Configuration and Start-up
The VariTrac system performs automatic configuration on start-up by locating all zone dampers or VAV boxes on the communications link and creating a database of zones, complete with default names. VariTrac takes control of all the zone dampers and calibrates them. It then calibrates the bypass system, establishes its own static pressure setpoint, and begins heating/cooling operation.

Discharge Air Control
VariTrac now does discharge air control. When there is a demand for heating or cooling from a zone, the CCP will control the discharge air temperature to the discharge air setpoint default (55°F cooling, 110°F heating), using as many stages as necessary. This allows VariTrac to do true capacity control under part-load conditions, and better manage the load created by increased ventilation air requirements.

Supply Air Tempering
It is now possible to enable the Supply Air Tempering function in a Voyager via the CCP. This allows the Voyager to cycle a stage of heat on and off to warm up the supply air stream and better manage the load created by increased ventilation air requirements.

CO2 Based Demand Control Ventilation
CO2 sensors many now be connected to VariTrac zone UCMs. Up to one sensor per zone on the system may be applied. The CCP Demand Control Ventilation configuration screen allows you to set a minimum ventilation damper position for the Voyager/Precedent unit, and a maximum ventilation damper position. You also configure a normal CO2 setting and an alarm CO2 setting. As the CO2 rises between the normal setpoint and the alarm setpoint, the CCP resets the damper position to increase ventilation. The CCP can be configured to gather CO2 measurements from one specific sensor, or to gather information from all the sensors on the system and select the highest value.

Zone Occupied Standby Function
A VariTrac UCM can now have an occupancy sensor connected to it, and can be configured to perform an occupied standby function. This mode is available whenever the VariTrac system is in the occupied mode. The zone will be in standby using its unoccupied setpoints if motion is not detected by the zone occupancy sensor. When motion is detected in the space, the UCM shifts to its occupied setpoints, and will remain that way until 30 minutes (adjustable) after motion ceases.

System Balance Mode
A VariTrac system can be placed in the balance mode from the operator display or the PC software using a single button selection. In this mode, the CCP automatically prepares the VariTrac system for balancing by starting the supply fan, disabling heating and cooling, closing the bypass damper, and opening all zone dampers to their maximum position. The system can then be balanced as a single zone system using mechanical hand balancing dampers.

Global Sensor Setpoint Limit Set-up
If the zone setpoint thumbwheels are enabled, their functional range should be limited to about a 5 degree span to avoid nuisance changeover. This requires you to access each individual UCM and manually adjust the limits. The new VariTrac CCP allows you to create a single set of limits, and then broadcast them to all the zones on the system at one time by pushing a single button.

Application Considerations for Changeover-Bypass-VAV

A building with varying loads due to occupancy, time-of-day, or other special needs is a likely candidate for a changeover-bypass VAV system. Also, any structure required to meet the higher ventilation requirements associated with ASHRAE Standard 62 is a prime target. These applications include:

- **Offices and small manufacturing buildings** – Varying occupancy places varying demands on the HVAC system.
- **Schools** – Heightened concerns about indoor air quality (IAQ) affect both new and existing applications.
- **Strip malls, movie theaters, health clubs** – Variable vacancy and special needs for conditioned air apply in these buildings.
- **Clinics, nursing homes, small hospitals** – These buildings can be multi-purpose and almost always have special requirements for conditioned air.

Customer Identification

In technical sales, it is important to understand the answer to a fundamental question: Who needs this product and why?

Ideal customers for VariTrac changeover-bypass VAV systems include:

- customers with buildings having significant variable occupancy (schools, office buildings, etc.)
- customers with buildings that want better tenant comfort, at a reasonable price
- building owners or facility managers that receive constant complaints about hot or cold areas in their building
- customers with buildings operating in locations requiring compliance with IAQ codes and standards.
- customers that value Trane's ability to bring a simple, pre-engineered, integrated solution to the job

Regardless of the customer, Trane's message to the marketplace is that it is the entire packaged comfort system that matters, not the parts and pieces of one manufacturer over another.

Building Owners

Most building owners readily understand the concept of "total cost of ownership." They are concerned not only with the first cost of their building's HVAC system, but also with the on-going operating costs associated with that equipment. Trane's changeover-bypass VAV system can reduce both first cost and the on-going operating costs normally associated with a larger, more complex system.

Consulting Engineers

With the increasingly rapid changes in technology, engineers are pressed to keep up with the more complex building codes and standards, let alone, the control systems that must adhere to these measures. With Trane's changeover-bypass VAV, the systems are simple, yet they address customers' concerns regarding the latest issues with IAQ. Local, state, and federal building codes increasingly set forth requirements that are associated with adherence to ASHRAE 62 to assure that IAQ is a design requirement, especially for new construction. As a result, consulting engineers are looking for proven ways to address the IAQ issue.

Contractors

The first cost benefits associated with Trane's changeover-bypass-VAV systems are important to contractors because:

- at the top of their list is a "delivered" system that requires very little programming, virtually no engineering, and is simple to install, operate, and service
- auto-configuring saves hours over having to locate and match terminal units in the field to the software in the main controller
- a one-step balance mode saves hours over the traditional method of balancing a VAV system
- an integrated bypass sensor assembly that does not require running wires back to the central controller will reduce wiring errors in the field

Trane Sales Force

The Trane sales force has the opportunity to sell both equipment and controls in one integrated package. Trane provides a complete solution. This one-stop shopping capability is backed by the considerable resources that Trane offers on all of its products.

Selling Changeover-Bypass-VAV Systems

Trane's largest competitor for selling VAV zoning systems is Trane! We sell more rooftops with programmable thermostats than our competitors do selling their VAV zoning systems. In other words, even though we have a formidable competitor with Carrier's VVT system, we would and could hold a similar share in the marketplace by selling Trane's VariTrac over single units with programmable stats without even worrying about our competition.

The most effective way to sell Trane's zoning systems against the competition is based on system simplicity, auto-configuration, an integrated system, and the new digital display. In addition, many other new features and functions have been added. Refer to the table on page 6 for more information.

Finally, we need to capitalize on our contractor relationships. In many areas of the country we have not begun to call on these light commercial contractors, or maintain the relationships that exist today. The key to success is to take full advantage of the delivered products that are now available, call on and educate your contractors, then sit back and take orders.

Competition

VAV zoning controls are available from a variety of sources, however, most of them do not offer an integrated package with the equipment. Many of these companies do not offer a pre-engineered package that comes as a standard offering. Instead they supply parts or pieces of the whole system. There is significant risk in working with these companies up-front and after installation. Coordinating mechanical and electronic builds between multiple suppliers is difficult and it is possible that these suppliers will not be able to respond to service or reliability issues.

Trane is the leading system controls supplier on new equipment, and holds the leading share of the new construction controls market. Trane has made significant effort to become the premier integrated systems leader, and the competition is not even close.

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For more information contact your local district office or e-mail us at comfort@trane.com

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